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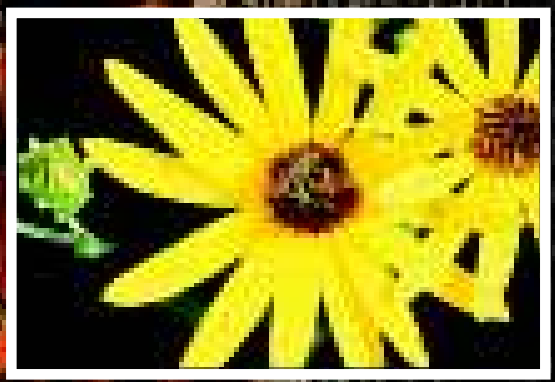
Fall 2001

Land Air & Water



Kentucky Natural Resources and Environmental Protection Cabinet

Land
Air&Water

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Annual conference focuses on energy issues and smart growth

This year's Governor's Conference on the Environment focuses on matters close to the heart of Kentucky—energy and wise land use.

The two-day event beginning Tuesday, Oct. 30, will call for discussions regarding industry improvements and advancements that have been made in production processes, recycling and technologies beneficial to the Commonwealth. On Wednesday, Oct. 31, Gov. Paul Patton will address the conference. The morning sessions will have topics concentrating on energy issues and smart growth. The first session, *Energy Issues Facing Kentucky,* will provide a review of regional energy policies, and an update from the Kentucky Energy Policy Advisory Board on environmental and electric transmission assessments. It will also include a discussion on energy initiatives that help support our local economy and environment.

The second session, *The Governor's Smart Growth Task Force,* will feature committee reports of efforts through forums and meetings to develop a quality growth plan that will incorporate economic development while preserving Kentucky's natural resources.

The 26th annual conference will be held at the Embassy Suites in Lexington. For information about conference registration, contact Boyce Wells at the Department for Environmental Protection at (502) 564-2150.

Kentucky to host Region IV conference

U.S. EPA Region IV staff will gather on Oct. 28-30 to share information about improving assistance to small businesses that must comply with the Clean Air Act. The small business ombudsmen and technical assistance program staff, as well as the chairperson from each state compliance advisory panel, are invited to attend. The conference will be held at the Hilton Suites in Lexington and will be open to the public. In addition, the Kentucky Air Quality Small Business Panel will hold its quarterly meeting on Oct. 29 from noon to 1 p.m. in order for its members to attend the afternoon session of the conference.

For additional information call Rose Marie Wilmoth at (502) 564-2150.

Land Air&Water Online

Visit *Land, Air & Water* magazine on the World Wide Web at
www.kyenvironment.org/nrepc/landairwater.htm

what's inside

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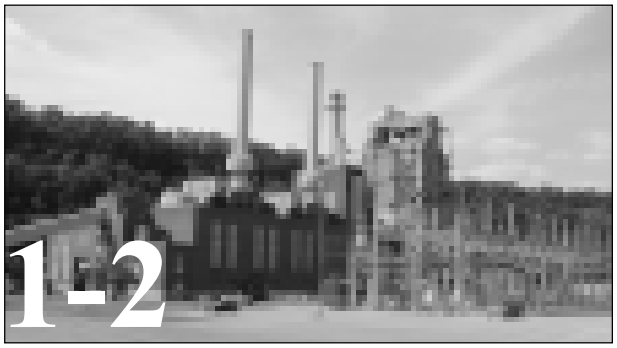

Features

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Printed by Gateway Press
Louisville, Kentucky

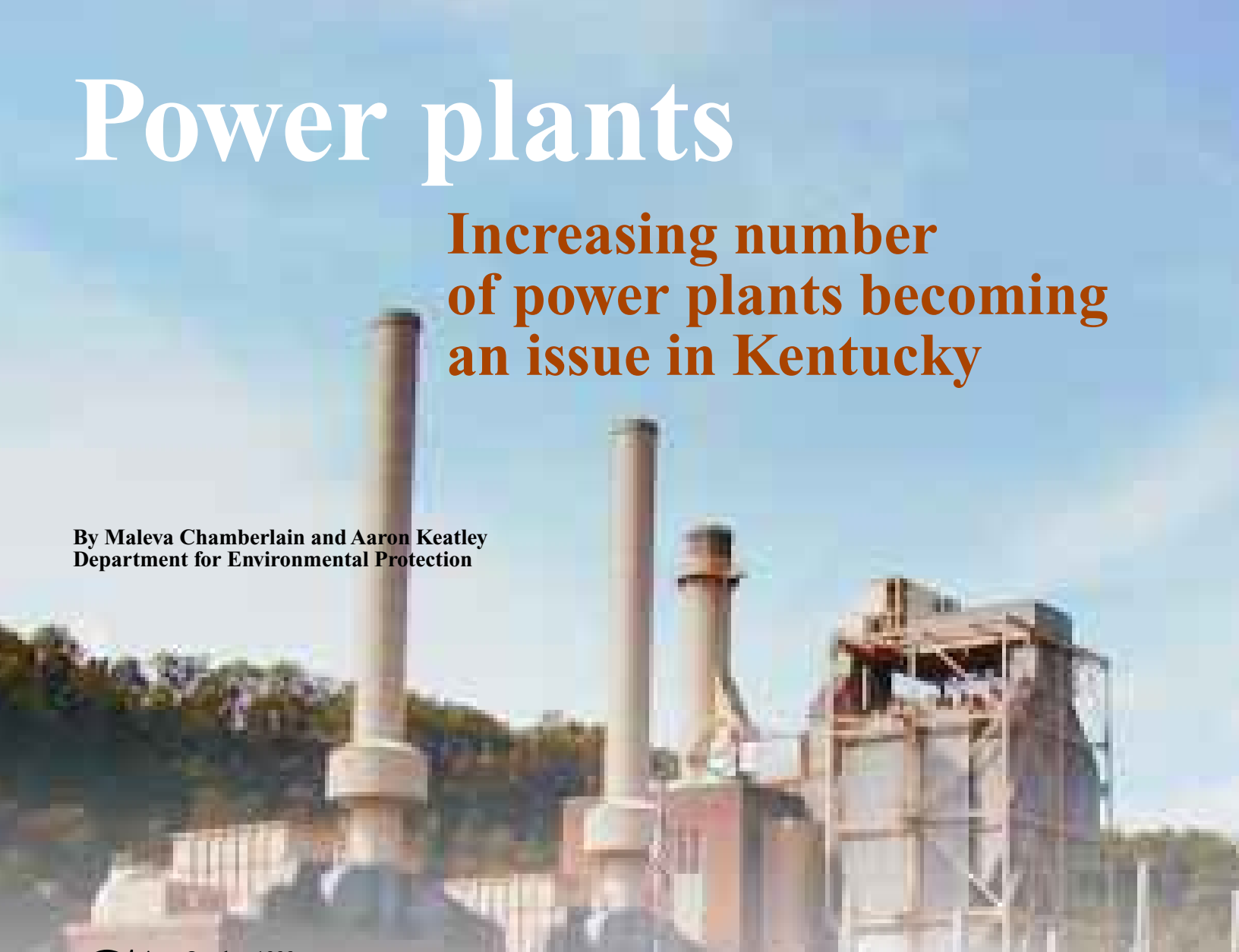
On the Cover

MAIN PHOTO: The beautiful fall colors of Pine Mountain were photographed by Merle M. Wasson, Division of Waste Management, Frankfort.

INSETS: This Northern mockingbird (Mimus Polyglottos) was photographed by Gary Ritter, Frankfort. The Purpledisk sunflower (*Helianthus atrorubens*) was photographed by Julian Campbell.

Power plants

Increasing number of power plants becoming an issue in Kentucky



By Maleva Chamberlain and Aaron Keatley
Department for Environmental Protection

Since October 1999, twenty-two new power plants have been proposed to be built in Kentucky. These would join the 35 that already exist in the state. The majority of the power produced by the proposed plants would be sold outside the state.

A variety of concerns caused Gov. Paul E. Patton on June 19 to impose a 180-day moratorium on permits for new power plants until the Department for Environmental Protection and the state Public Service Commission could study potential impacts of this number of plants. A workgroup from within the department is preparing a report of its study to be provided to Gov. Patton by Dec. 7.

These are some of the issues the workgroup is studying:

Air

- Some pollutants emitted by power plants may increase ***ozone*** problems.
- ***Volatile Organic Compounds (VOCs)*** aid in the creation of ozone. Some VOCs are very toxic and can cause cancer and other detrimental health effects.
- ***Nitrous Oxides (NOx)*** also lead to the creation of ozone. Power plant units must possess emissions credits that will allow NO_x emissions, or they will need to purchase these credits. There may be a limited availability of such credits.
- Power plant emissions of sulfur dioxide (SO_2), particulate matter and NO_x can adversely affect ***visibility*** in such specially protected areas as the Mammoth Cave National Park and the Great Smoky Mountains. Increases in SO_2 and NO_x emissions could also increase acid deposition.
- Very small particles, referred to as ***particulate matter*** or $PM_{2.5,}$ can cause respiratory problems and other adverse human health effects. Particulate matter is also a contributor to haze. If $PM_{2.5}$ levels were to exceed the national standard, some counties could be designated as nonattainment for that pollutant. In that event, control measures would need to be imposed on all facilities that contribute to $PM_{2.5}$ levels.
- ***Heavy metals*** can cause significant adverse health effects.
- Power plants are a known source of some chemicals designated as ***Hazardous Air Pollutants***. These pollutants, which include some VOCs, Synthetic Volatile Organic Compounds and metals, are known to cause adverse health and environmental effects.

Water

- Power plants use significant quantities of water. Impacts resulting from

withdrawal of significant amounts of water include reduction of water availability for others, permanent removal of water from a stream system and supply and quality impacts on public water supplies that withdraw from the same water resource.

- Water used as part of power production as well as stormwater from the area of the power plant is usually ***discharged*** to a river or stream. Process water can contain chemicals and can also be warmer than the receiving stream, adversely affecting the stream system. Stormwater can transport a variety of contaminants originating from the plant's property as well as from the fuel and waste storage areas.
- Construction and operation of any major industrial facility can cause a ***loss in critical wildlife habitat***. Wetlands, riparian zones, floodplains and karst features are examples of environmentally sensitive areas that can be affected.
- ***Air deposition*** of metals is a significant contributor to some of the state's current water quality problems. Pollutants such as mercury often work their way into the food chain where their concentrations are magnified and their impacts are more severe. There is currently a statewide fish consumption advisory for mercury.
- ***Groundwater resources can be contaminated*** from plant processes, fuel storage areas, and ash management and disposal areas.

Waste Management

- ***Ash*** generated as a waste product of power generation is typically put into an ash pond or disposed of in a landfill. This ash often contains metal compounds for which proper management would be critical to protect soil and groundwater. Different disposal requirements could apply depending on the composition of the ash.
- ***Leachate*** collected from ash storage and disposal areas must be properly characterized and disposed of or discharged, depending on the leachate's characteristics.

Permitting

Most power plants require permits from the Division for Air Quality. Depending on various factors, they may also need permits from the Division of Water and the Division of Waste Management. The Department for Environmental Protection will need to work closely with any proposed plants to insure proper and appropriate permitting is applied for and coordinated through its various divisions.

Extraction

The proposed plants will require an increased amount of fuel to fire the generation units. An increase in coal, gas and oil production to meet these needs will likely contribute to secondary environmental issues and problems.

A summary of environmental impacts and discharges from existing power plants*

Nitrous oxides — 300,000 tons/year
Hazardous air pollutants — 6,000 tons/year
Sulfur dioxide — 500,000 tons/year
Ash — 18,000 tons/day
Wastewater discharge — 7.3 billion gallons/day. Discharges include total dissolved solids, sulfates, chlorides and ash. Discharges also are typically at higher temperatures.
Water withdrawal — Most power plants are exempt from water withdrawal permitting and reporting requirements. Existing facilities are estimated to withdraw billions of gallons of water each day.

*These are approximations. Detailed information will be available from the completed report.

Photograph provided by Mark York, Office of the Secretary.

Information for this article provided by the Department for Environmental Protection.

List of proposed plants in Kentucky and type of fuel used to produce electricity (since Oct. 1, 1999)

Natural Gas/Oil
Dayton Power and Light Hardinsburg, Breckinridge County
East Kentucky Power - J.K. Smith Station, Clark County
Duke Energy - Marshall Co. Generation, Marshall County
Duke Energy - Metcalfe Co. Generation, Metcalfe County

Natural Gas
Trigen-Cinergy Solutions of Silvergrove, Campbell County
Columbia Electric Corp. - Grane Creek, Henderson County
Louisville Gas & Electric - Paddy's Run, Jefferson County
Cinergy - Erlanger, Kenton County
Dynergy - Riverside Generation, Lawrence County
Air Products and Chemicals, Marshall County
Enron - Calvert City Power, Marshall County
Westlake Energy Corp., Marshall County
Dynegy - Bluegrass Generation, Oldham County
Louisville Gas & Electric - Trimble Station, Trimble County

Gasified Coal/Gasified Garbage
Global Energy - Kentucky Pioneer Energy, Clark County

Waste Coal/Biomass
Calla Energy - Estill County

Coal
Cash Creek, Henderson County
East Kentucky Power Cooperative - Spurlock, Mason County
Thoroughbred Generating, Muhlenberg County

Waste Coal
Kentucky Eastern Power, Martin County
Kentucky Western Power, Marshall County
Kentucky Mountain Power, Knott County

Students learn about energy through NEED project

By Karen Landry
Division of Energy

The headlines are a daily reminder that our nation faces significant energy challenges. Higher energy prices, threats of rolling black-outs in some parts of the country, concerns about pollution, debates over where to locate power plants—these are not temporary problems and the solutions to them are not simple. As our economy grows, our demand for energy will grow. Thus, the energy policy issues challenging us today will likewise challenge the next generation.

Many of Kentucky's students are learning about these issues through an exciting, comprehensive energy education program called KyNEED. KyNEED is the Kentucky affiliate of the nonprofit National Energy Education Development (NEED) project. The goal of the NEED project is to promote an energy-educated society by designing and delivering balanced, science-based energy education materials, programs and techniques to the nation's teachers and students. The NEED project was launched by Congressional Resolution in March 1980. This event marked the beginning of an effort to develop a grassroots energy education network.

Today, more than 6,000 schools in 35 states use the NEED program in their classrooms. The KyNEED program is one of the more successful NEED affiliates in the country [See sidebar for more on Kentucky's successful program]. During the 2000-2001 school year, 148 teachers and 847 students attended KyNEED workshops statewide.

The NEED program's K-12 curriculum incorporates a "kids-teaching-kids" approach to learning and leadership development. This hands-on approach engages students in cooperative learning activities that teach about all aspects of energy—scientific concepts on the forms of energy, energy sources and environmental and economic impacts of energy use. NEED programs are heralded across the United States for their innovative teaching strategies that allow students to become the directors of their own learning.

Recognition of student achievement is an integral component of the NEED project. In Kentucky, students are honored at the annual Youth Awards Program in Frankfort. At the national level, students are honored in Washington, D.C. These awards programs acknowledge all schools involved in the NEED project during a school year and recognize those who achieve excellence in energy education in their schools and communities.

Natural Resources and Environmental Protection Cabinet Secretrary James Bickford (second from right) stands with the Harrison County Middle School "Energy Busters." This seventh-grade group won the Rookie of the Year Junior Level Award. Photo provided by Kim Jenkins, Harrison County Middle School teacher

The program is exciting and rewarding for teachers, too. For example, in July of each year, NEED offers five-day training conferences that provide teachers with the most up-to-date information on all aspects of energy. These conferences (in places like Ventura, Calif., Albuquerque, NM, Williamsburg, Va., Providence, R.I.,) also give teachers the opportunity to speak with experts in the energy field and visit interesting energy-related sites.

All NEED materials are correlated to the National Science Education Content Standards and to the Kentucky Program of Studies. In NEED classrooms, students learn how coal is mined, how oil and natural gas are produced, and how solar energy is harnessed. They debate the pros and cons of energy sources and devise plans to provide additional electric capacity for a growing country.

For more information about the NEED program, visit the Web site at **www.need.org.**

National Youth Awards Ceremony

Kentucky students excelled in energy education during the 2000-2001 school year, with four schools receiving honors at the national level. These schools are:

- Graves County High School, Mayfield, Ky., Senior Level School of the Year.
- Phillip A. Sharp Middle School, Butler, Ky., Junior Level School of the Year (one of two).
- West Jessamine County High School, Nicholasville, Ky., Senior Level Rookie of the Year.
- Harrison County Middle School, Cynthiana, Ky., Junior Level Rookie of the Year.
- Southern Elementary School, Falmouth, Ky., Rookie finalist.

Ozone coalitions

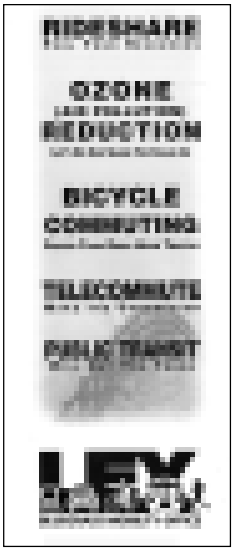
Educating communities on the importance of clean air

Information and photograph by Lillie Cox
Division for Air Quality

Ozone coalitions are voluntary associations of local governments, organizations and businesses committed to reducing smog in their areas. They address smog problems through public and business education, involvement and outreach. Many coalition activities take place throughout Kentucky during the summer months to help communities learn more about air quality issues caused by smog. Listed below are the ozone coalitions in Kentucky and some of the activities that they sponsor.

Cincinnati/Northern Kentucky Regional Ozone Coalition (ROC)

The Cincinnati/Northern Kentucky Regional Ozone Coalition issues smog alerts to citizens of Boone, Campbell and Kenton counties. The ROC developed the "Do Your Share For Cleaner Air" slogan that is now being used by coalitions across the United States. The coalition sponsors workshops to help K-12 teachers learn about vehicle maintenance and "cleaner cars," a calendar contest for students, the Clean Air-A-Thon 5K Run/Walk and works with governor's scholars each summer on various community activities like gas-cap testing.



Kentuckiana Ozone Prevention Coalition (KOPC)

The Kentuckiana Ozone Prevention Coalition works to curb ground-level ozone for the Louisville/Jefferson County area and specific areas of Indiana. It is committed to educating the regions about ozone and promoting actions that can be utilized by businesses, the public sector and individuals that will directly reduce ground-level ozone and improve the quality of air in Kentuckiana. The coalition sponsors ozone season kick-off activities and various other events at Earth Day, the Kentucky State Fair and other Louisville area activities throughout the summer.

Lexington Bluegrass Mobility Office and the Ozone Reduction Committee

The Lexington Bluegrass Mobility Office and the Ozone Reduction Committee is the central point of contact in all inquiries concerning mobility (transportation) issues. The mobility office offers a carpool/vanpool computer ridematching program that includes LexVan, a work-commute vanpool leasing program. It also provides a free gas cap to any motorist in Lexington/Fayette County or Nicholasville/Jessamine County who has a leaking or missing gas cap. The goal is to replace 4,000 caps over a two-year period. The coalition also offers free rides on LexTran buses on ozone alert days when air quality index levels reach the unhealthy category.

What is smog?

Smog (ground-level ozone) is a problem in a number of areas of Kentucky that has negative health and economic impacts.

Smog is formed by a chemical reaction between Volatile Organic Compounds (VOCs) and oxides of nitrogen in the presence of sunlight and warm temperatures. The primary "man-made" sources of VOCs and oxides of nitrogen are vehicles and industrial emissions.

Smog season is typically between April until the end of October, worse in the afternoons and early evenings. Air quality monitors help meteorologists and air quality officials determine when to call a smog alert.

TOP: ***Governor's scholars test for leaking gas caps in the northern Kentucky area.***
LEFT: ***Lexington Bluegrass Mobility and the Ozone Reduction Committee printed this brochure to help citizens make wise decisions about their transportation choices.***

Smog/Ozone Alerts

When weather conditions indicate possible high smog levels in an area, an alert is announced through local television, radio and newspapers. Businesses, government agencies, members of the media and interested citizens in the area are also alerted.

Because the alert is issued the day before high ozone levels are predicted, people can plan ahead and postpone activities that create smog.

When an alert is issued, everyone is asked to make some changes in their daily habits:

- Ride the bus or share a ride/carpool/vanpool.
- Keep vehicles properly maintained.
- Drive 55 mph instead of 65 mph, thereby reducing pollution by 10 percent.
- Avoid using gasoline-powered lawn equipment on ozone alert days.
- Refuel after 6 p.m. and don't top off the tank.

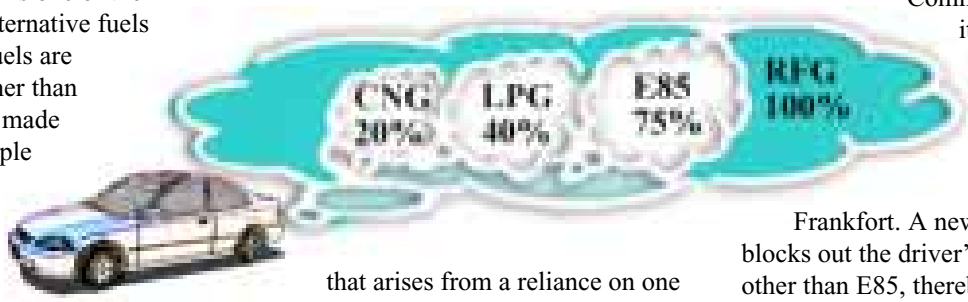
Kentucky leads the journey on the alternative fuels highway

By Karen Landry
Division of Energy

LEFT: ***Lt. Gov. Steve Henry (center) fills the tank of a state vehicle at the Murray State University ethanol fueling station along with John Davies, Division of Energy director (left), Latoya Brown, zone manager, with Ford Motor Co. (right).***

BELOW: ***The new ethanol fueling tank at Murray State.***
Division of Energy photos

Melissa Howell never dreamed Kentucky's market for alternative fuel vehicles (AFVs) and alternative fuels would be as strong as it is today. Howell, executive director of the Kentucky Clean Fuels Coalition, points out that many people would be surprised to know that Kentucky is one of the leading states in the alternative fuels market. Alternative fuels are defined as any fuel other than gasoline or diesel fuel made from petroleum. "People would logically think of California," she says, because of their more severe air quality problems, but Kentucky's growth in the market only makes sense when, as Howell points out, you have a product that sells itself.



More than 3,000 AFVs are running on Kentucky highways. They use ethanol (E85), compressed natural gas (CNG), propane (Liquefied Petroleum Gas—LPG), electricity or biodiesel. All the alternative fuels reduce ozone-forming tailpipe emissions. The diagram above shows the percentage of combined carbon monoxide (CO) and nitrogen oxide (NO_x) emissions for three alternative fuels as compared to reformulated gasoline (RFG).

In addition to their air quality benefits, alternative fuels help our nation reduce its dependency on petroleum imports and the resulting price volatility that arises from a reliance on one energy source to fuel our vehicles. Even if the United States increases its domestic drilling for oil, as proposed in the National Energy Plan, our nation would still be heavily dependent on imports.

Many alternative fuels use renewable commodities that can be produced locally. E85 uses 85 percent ethanol made from corn, sugar cane or feedstock. Propane, a byproduct of natural gas processing, is also domestically produced.

Most of the growth in the alternative fuels market in Kentucky has occurred since the inception of the nonprofit Kentucky Clean Fuels Coalition (KCFC) in 1993. The goal of the KCFC is to improve air quality and support economic development across Kentucky by promoting the use of alternative transportation fuels. Membership is composed of major auto manufacturers, equipment providers, private and public fleet managers, government agencies (including the Kentucky Division of Energy with funding support from U.S. Department of Energy (DOE)), fuel providers and universities.

KCFC manages the Kentucky Clean Cities program established in 1993, a voluntary, locally based government/industry partnership that helps mobilize local stakeholders in the effort to expand the use of alternative fuels, accelerate the deployment of alternative fuel vehicles (AFVs) and build a local AFV refueling infrastructure.

Today, more than 80 communities across the nation have joined the Clean Cities program sponsored by the U.S. DOE. Through the partnership, the KCFC has secured more than $3 million for alternative fuel projects across the Commonwealth. Through its efforts, Kentucky's state government E85 vehicle fleet now has a fueling facility at the state's motor pool in Frankfort. A new purchasing card blocks out the driver's ability to buy a fuel other than E85, thereby guaranteeing that E85 will be used. With 200 E85 vehicles in the Frankfort fleet, this new facility is a big step in supporting the ethanol market. This project is a testament to the program's success because it shows that in Kentucky when it comes to AFVs, "we walk the walk," according to Howell.

The infrastructure just keeps growing. On Aug. 1, 2001, Murray State University opened its ethanol fueling facility to service the school's fleet of 31 E85 vehicles. The installation is part of a $75,000 program funded by Ford Motor Company to help develop Kentucky's alternative fuel infrastructure. At the dedication ceremony, Lt. Gov. Steve Henry, co-founder of the Kentucky Clean

Continued on page 15

Environmental trends and conditions

Commission reports on Kentucky's environmental record

By Lola Lyle
Environmental Quality Commission

The Kentucky Environmental Quality Commission (EQC) recently issued its fifth update to the *State of Kentucky's Environment* report. The report contains more than 200 charts detailing trends in the areas of air and water quality, waste management, toxic pollutants, natural resources, coal mining and energy. The report shows that we have made significant headway in protecting the environment, from reducing farmland erosion rates to prosecuting open dumpers.

Consider these facts:

- a record number of Kentucky's households, 80 percent, now participate in a door-to-door garbage collection program;
- public drinking water in many communities is safer, with far fewer persistent violators of safe drinking water standards;
- levels of air pollution continue to decline, making air safer to breathe; and
- populations of some of the state's most fragile species of wildlife, like the bald eagle and Virginia big-eared bat, are increasing, the result of protecting critical habitat.

However, many important challenges still remain. The EQC found that the state is losing ground in 20 areas. Some examples of these disturbing trends are:

- water quality inspections, violations and fines were near record lows in 1999;
- the state continues to lose its best farmland to other uses with 109 acres per day being converted to urban areas;
- Kentuckians are consuming more energy than ever before and conserving less natural resources; and
- toxic chemicals, such as mercury, have made their way into our lakes and rivers, thereby making it unsafe for many people to consume some species of freshwater fish.

Kentucky's prosperity and quality of life depends greatly on the health of our environment. It is important to look at these trends—both the good and the bad—in order to have a better idea of the progress Kentucky has achieved to date, as well as the issues continuing to face the state.

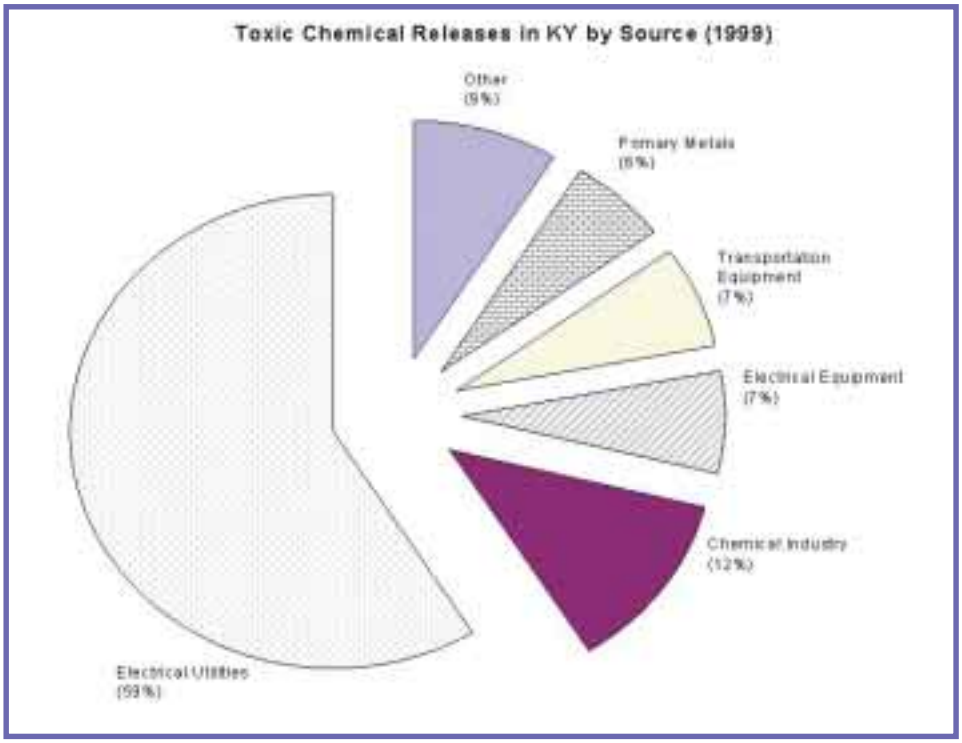
While Kentucky faces many environmental challenges, none are as great as managing our waste. Kentuckians are generating and disposing of more waste than ever before—some 5.5 pounds per person per day. That amounts to 22 million pounds of garbage a day. An estimated 5 to 7 percent of Kentucky's population is still illegally dumping their waste. That amounts to 1.5 million pounds of waste per day. While Kentucky is winning the battle to clean up open dumps, 2,000 dumps were cleaned up in 1999, we are still losing the war as dumpers toss their waste down yet another hillside.

As we look to the future, Kentucky's environment will confront even more challenges from a growing population, expanding economy, record logging of forests and the energy crisis. Now, Kentucky's environmental programs are also facing budget cuts due to a projected state revenue shortfall. The impact of these cuts could greatly impair the state's ability to maintain the environmental progress achieved to date.

2000-2001
State of Kentucky's Environment

An update to the report is now available. This report is a one-volume, 172-page publication detailing the conditions of Kentucky's environment.

To order a copy of the report, send a $10 check made payable to the Kentucky State Treasurer to EQC, 14 Reilly Rd., Frankfort, KY 40601.



Coal-fired power plants led Kentucky in toxic chemical releases in 1999, accounting for 59 percent of the 100 million pounds of toxic chemicals reported released to the environment.
Note: Releases reported at site of generation.
Source: Toxics Release Inventory Report.

Rock Creek makes a comeback

By Mark Meade and Mark Carew
Abandoned Mine Lands

Rock Creek is a beautiful stream that flows through southwestern McCreary County. As its name implies, it is strewn with magnificent boulders, riffles and races, all of which led to its designation as a Kentucky Wild River. The stream offers anglers a real treat with a blue-ribbon trout fishery.

Rock Creek flows out of Pickett and Scott counties in Tennessee and then into Kentucky. At its confluence with White Oak Creek, the Kentucky Wild River status ends, but not because it isn't just as magnificent as it is upstream. Acid mine drainage from many deep mines and refuse piles in the watershed pollute Rock Creek from White Oak Junction to the Big South Fork of the Cumberland River. This acid mine drainage is sulfuric acid generated by pyrite in the strata associated with the mined coal seams, resulting in metals being dissolved in the drainage. The combination of low pH and dissolved metals has made it difficult for much of anything to live in this stretch of Rock Creek.

That is changing thanks to the cooperation of several government agencies and one private group. The Rock Creek Task Force was formed to find solutions to the degraded water quality in the lower Rock Creek watershed.

In 1995, an initial water sampling of more than 40 mine portals by Department for Surface Mining Reclamation and Enforcement personnel identified mine sites that were major contributors to the acid mine drainage entering the watershed. In 1998, a biological and water-monitoring program began in the White Oak Creek and lower Rock Creek watersheds. Through this program, samples of macroinvertebrates and fish species are taken periodically by Abandoned Mine Lands (AML), Division of Water, U.S. Forest Service and Department of Fish and Wildlife Resources personnel. This data is used to measure the progress and success of the reclamation project.

Funding for reclamation and acid mine drainage abatement were obtained through grants from the U.S. Office of Surface Mining's Appalachian Clean Streams Initiative, Division of Water's 319 program, PRIDE (Personal Responsibility In a Desirable Environment) and the Division of Abandoned Mine Lands.

In spring of 2000, a pilot project was started to add alkalinity into the watershed. Alkalinity additions neutralize the acid that is being produced by the abandoned mines. Sand-sized limestone was introduced into selected tributaries within the watershed. These small limestone particles slowly dissolve into the water building up alkalinity. The stream is buffered and the acid load is reduced.

While this technique is being used for the first time in Kentucky, it has been used successfully in other states. After only two months of dosing with limestone sand, the flow out of Rock Creek into the Big South Fork changed from being acidic to alkaline. After five months, similar results were obtained in White Oak Creek.

In the fall of 2000, a reclamation and water treatment contract was awarded to Young Earthmoving of London, Kentucky, to excavate acidic refuse from the banks of Rock Creek, reclaim two coal load-out areas, establish limestone treatment ditches, reclaim a coal refuse fill and continue dosings of the limestone sand.

Testing of the coal mine refuse along the banks of Rock Creek and elsewhere revealed that the mine waste was some of the most acidic material in the state. In an effort to neutralize the material, ag-lime was mixed with the refuse as it was being placed into a compacted fill. The fill was then capped with soil material and revegetated.

A modified anaerobic vertical wetland designed by an AML geologist was installed at a portion of the project known as Paint Cliff. Extremely acidic water was discharging from both a coal refuse pile and an abandoned deep mine at this site. To date the wetland has reduced the acid and metal load flowing into Rock Creek from the Paint Cliff site by more than 90 percent.

These Kentucky agencies and a private organization make up the Rock Creek Task Force

Division of Water
Department of Fish and Wildlife Resources
Department for Surface Mining Reclamation and Enforcement
Division of Abandoned Mine Lands
U.S. Forest Service
U.S. Geological Survey
U.S. Fish and Wildlife Service
U.S. Natural Resources Conservation Service
U.S. Army Corps of Engineers
U.S. Office of Surface Mining
National Park Service
Trout Unlimited

Monitoring results of the water quality and the aquatic life in White Oak Creek and on Lower Rock Creek have been very encouraging. In White Oak Creek before the limestone sand introduction, fish surveys found no fish.

In the summer of 2000, after five months of limestone sand treatment, there were 91 creek chubs found in the fish survey. In July 2001, there were four species found including creek chub, green darter, stoneroller and blackside dace. Blackside dace are a federally protected species listed as threatened.

The Lower Rock Creek fish surveys have yielded multiple species in good and improving numbers. The July 2001 fish survey even collected a brown trout and a blackside dace in the acid mine drainage impacted section of Rock Creek.

Phase 2 of this project is already in the works. Another contract will be bid to install more alkaline-producing features in the watershed to ensure long-term results in Rock Creek. This will reduce the need for limestone dosing of the tributaries. The four miles of Rock Creek impacted by the acid mine drainage may become a viable fishery thanks to the hard work and cooperation of the many agencies involved.

Kentucky River gets a "clean sweep" by area volunteers

By Cindy Schafer
Public Information and Education Branch

"Many people depend on the Kentucky River for their water supply, and that's a good reason to clean it up," said Bob Rasmusson, coordinator of the 2001 Kentucky River Sweep.

More than 1,000 volunteers from 22 counties came to the tenth annual event to pick up garbage at 40 separate locations along the river.

Rasmusson, Madison County's solid waste coordinator, believes the river sweep is important, and he wants to see it continue. "There's been a definite improvement in the river," he said. "It appeared cleaner this year than in previous years."

Besides the normal assortment of cans and bottles, items of trash that volunteers came across included car bodies, tombstones, tires and household appliances.

A total of 147 miles of shoreline were cleaned. The photos on this page were taken along the river at the Fort Boonesborough State Park.

Trash collected

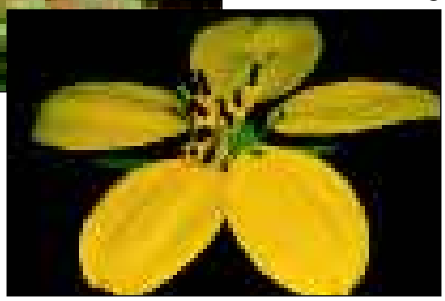
Bags of garbage—3,207
Tons of garbage—63

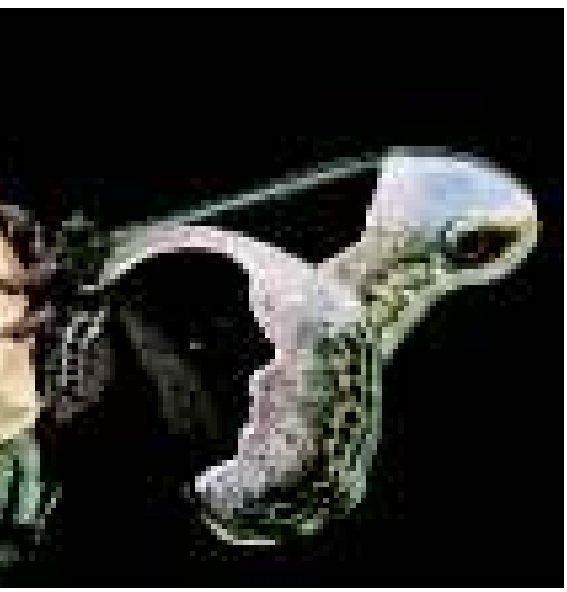
Counties participating

Anderson, Bell, Boone, Boyle, Breathitt, Clark, Clay, Estill, Fayette, Franklin, Garrard, Grant, Jessamine, Laurel, Madison, Mercer, Owen, Powell, Scott, Shelby, Wolfe and Woodford.

River sweep statistics and photographs courtesy of Bob Rasmusson

Commission celebrates a quarter-century of protecting natural wonders





TOP: ***Anglin Falls at John B. Stephenson Memorial Forest State Nature Preserve in Rockcastle County.*** Photo by Thomas Barnes

ABOVE: ***Lesquereux's bladderpod*** **(Lesquerella globosa)** ***is found only in the eastern inner Bluegrass areas, specifically Franklin and Scott counties.*** Photo by Kentucky State Nature Preserves Commission

LEFT: ***This promethea moth*** **(Callosamia promethea)** ***can be encountered almost anywhere in Kentucky.*** Photo by John MacGregor

By Cecilia Bunch
Kentucky State Nature Preserves Commission

The Kentucky State Nature Preserves Commission (KSNPC) is celebrating its 25th anniversary this year. Most Kentuckians accurately identify the work of the commission with the state's system of nature preserves that reach from border to border across the Commonwealth.

Created in 1976, the KSNPC's mission is to secure a lasting resource of natural areas for present and future generations of Kentuckians and to educate the public on the value of protecting the biodiversity of the state and the nature preserves systems in Kentucky. Since its inception, the KSNPC has protected more than 16,804 acres of land at 41 sites in 30 different counties. The sites include lands owned and managed by the commission as well as land owned by private foundations and other units of state or local government.

One of the KSNPC's biggest successes is Blanton Forest, the 13th largest old-growth forest east of the Mississippi. Located in Harlan County, it is more than 2,000 acres of untouched, uncut forest. The first portion of the property was purchased in 1995. In June 2001, the second tract of land was secured, and a celebration was held to commemorate this milestone in the campaign to preserve and protect Kentucky's premier and largest old-growth forest. The goal of the commission is to obtain additional acreage around the forest to act as a buffer, which will protect the forest from various threats such as unauthorized use and exotic species like kudzu.

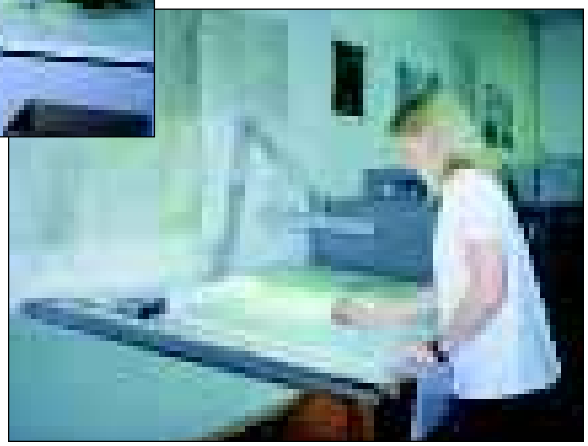
Another significant event took place this year—the dedication of Kentucky's 41st nature preserve. These preserves are scattered from one end of Kentucky to the other. They stretch from the newest preserve, Three Ponds in Hickman County to Bad Branch State Nature Preserve near the Virginia border.

The KSNPC has grown during the past 25 years. An office of three has increased to a staff of 21 employees. Apart from a small administrative staff, KSNPC has a core group of scientists that specialize in botany, zoology, biology and ecology, as well as data specialists. Commission biologists conduct inventories of the state to learn as much as possible about the species that live in Kentucky and document those species in

RIGHT: ***Bree McMurray, stewardship program assistant/ volunteer coordinator, examines a specimen in the laboratory.***

FAR RIGHT: ***Ellis Laudermilk, an invertebrate biologist, studies an individual specimen of a rare species.***

LOWER RIGHT: ***Amy Covert, environmental biologist/data specialist, references a map of element occurences.***
Photographs by Cecilia Bunch, Kentucky State Nature Preserves Commission



This female Cumberlandian combshell (*Epioblasma brevidens*) is an endangered species inhabiting only Buck Creek and Big South Fork Cumberland River.

decline. Of the 120 counties in Kentucky, 66 have been inventoried. These records are stored in a comprehensive database that is part of a national network of natural heritage programs useful to scientists and developers who wish to plan projects in an environmentally sensitive manner.

Botany

Botanists at the commission conduct field surveys to determine the range and abundance of 3,000 plant species. The information collected, along with that obtained from other botanists across the state, is used to determine which plants are becoming rare and vulnerable to extinction. A list of rare plants in Kentucky, to date about 400 species, is used to direct plant protection efforts such as site purchases and landowner agreements. In accordance with the federal government, KSNPC has agreed to help identify and protect those species that are listed, or being considered, under the U.S. Endangered Species Act. Nine federally listed species are the focus of coordinated recovery efforts every year.

Aquatic Biology

Kentucky's rivers, wetlands and lakes are home to a treasure trove of aquatic organisms. More than 240 native fishes and 104 freshwater mussels, the most imperiled animals in the United States, make their homes in Kentucky – more than in any state except Tennessee and Alabama. Much of this biodiversity has vanished as waterways have been polluted and altered.

The KSNPC has learned from years of extensive field work and research that streams such as the upper Green, Rockcastle and Licking rivers are nationally important for conservation because they continue to support rare fishes and mussels. These and select other areas, and the organisms they support, are remnants of our natural heritage.

Invertebrate Biology

It is difficult to estimate the actual number of species on the earth to the nearest order of magnitude. It has been estimated that the number of species ranges somewhere between five and 30 million.

In Kentucky, groups such as invertebrates and mosses have not been well catalogued even at the most basic levels. For example, one major group of insects, the beetles, comprises about 21 percent of all described species on earth, yet Kentucky has never had even a basic published checklist for this group. Species never before reported from the Commonwealth are found every year, and species that have never been formally described by scientists are still found occasionally.

Zoology

Kentucky wetlands, high-elevation forests and grasslands support nearly 70 species of mammals, more than 160 nesting birds and more than 100 amphibians and reptiles. Within these groups, several bats are among Kentucky's most endangered animals including the Indiana bat, gray bat and Virginia big-eared bat, all of which are known to occur in some of Kentucky's many caves.

The KSNPC has helped to protect many sites critical to endangered bats including caves used for maternity and winter hybernation, while monitoring the population levels and long-term population trends for these species.

Approximately one-quarter of amphibians and reptiles, nearly 30 percent of breeding birds and more than 20 percent of the state's mammals are considered endangered, threatened or of

Continued on Page 16

Task force receives national award

By Gwen Holt
Division of Forestry

Wildland arson fires damage millions of dollars in timber resources annually and threaten the lives and homes of many Kentucky citizens. Fifty-two percent of all wildland fires in the state are intentionally set.

The Kentucky Wildland Fire and Arson Prevention Task Force, established last year in March, recently received a Smokey Bear National Recognition Award for outstanding public service in forest fire prevention.

The task force was created to combat arson, the number one cause of wildland fires in the Commonwealth. Its mission is to enhance cooperation and coordination between local, state, federal and nongovernmental agencies, and to improve the level of knowledge and skills of those involved in wildland fire and arson prevention efforts within Kentucky.

This innovative program has led to a reduction in the number of arson fires in eastern Kentucky, an area consistently plagued by wildland arson. Twenty-seven arson cases have been investigated leading to 12 arrests and one juvenile petition.

The task force provides a law enforcement presence by using Arson Prevention Strike Teams assigned to areas that have a high incidence of wildland arson. These teams create public awareness by using local media, working with local officials, distributing FIREWISE materials and making personal contacts within the communities to educate citizens about wildland fire danger. The strike teams made more than 10,000 personal contacts last year.

Through task force efforts, the citizens of Kentucky are gaining an awareness of the wildland arson problem and the need to take action. Local communities are learning they can help reduce and prevent the needless destruction of thousands of acres of forests and reduce fire risks to personal property.

(Left to right) Bruce Jewell, U.S. Forest Service, presents the Smokey Bear award to Leah MacSwords, director of the Kentucky Division of Forestry; Bernie Andersen, division's fire chief; and Jim Funk, division task force coordinator.
Division of Forestry photo

Objectives of the Task Force

The Wildland Fire and Arson Prevention Task Force's objectives include reducing wildland arson through a strong law enforcement presence and follow-up investigations and prosecutions utilizing the assistance of the following agencies: the Kentucky State Police, Department of Fish and Wildlife Resources, Department of Parks, Transportation Cabinet and Natural Resources and Environmental Protection Cabinet (NREPC), State Fire Marshal's office and Kentucky National Guard. Other partners include the U.S. Forest Service and several associations representing the Kentucky chiefs of police, professional firefighters and Kentucky sheriffs. Additionally, Eastern Kentucky University's College of Justice and Safety collects data on arson-related fires and researches the attitudes of citizens regarding forest arson. The Kentucky Community and Technical College system provides wildland fire training to 800 volunteer fire departments statewide. The Kentucky Division of Forestry is the lead agency with support from the NREPC's Office of the Inspector General.

Water education models available to Kentucky schools

The Kentucky Environmental Education Council, Kentucky Division of Water and Northern Kentucky University are collaborating on a project to help teachers provide instruction on water quality issues in our state. The project has placed table-top watershed models, called Enviroscapes, in 24 schools across the state, as well as at the Louisville Nature Center. Enviroscape models, which cost approximately $2,000 each, provide a very visual and hands-on way to teach even very young students how runoff pollutes our water system and how community planning and natural features such as wetlands and grassy areas can prevent water pollution.

These models are available for a two-week loan to any schools that wish to use them. In addition, interdisciplinary lesson plans that expand what students learn as they use the models have been created for all grade levels. These lessons are aligned with the core content and use a variety of instructional strategies to teach these very important concepts. These lesson plans can be obtained by calling the number listed below, or the model can be picked up from the host school.

For more information on how your school can borrow the Enviroscape, contact the Kentucky Environmental Education Council at (800) 882-5271 or go to its Web site at **www.state.ky.us/agencies/envred/** and look at the page on Resource Schools in Kentucky. The contact person listed for each school is responsible for loaning the Enviroscapes. Find the school nearest you and just click on its name to send an e-mail request.

Cost Share program continues to grow

By Director Steve Coleman
Division of Conservation

Now in its seventh year, the Kentucky Soil Erosion and Water Quality Cost Share program is proving to be a big success. The program, administered by the Division of Conservation and local conservation districts, was established by the 1994 General Assembly to help landowners and citizens across the Commonwealth address environmental concerns and, in particular, assist agriculture producers in developing and implementing agriculture water quality plans.

In the beginning, the program started with $650,000; over the past seven years it has grown to an annual appropriation of $11,150,000. This money is received from the General Fund, as well as from the Kentucky Department of Agriculture and the Phase I Tobacco Settlement Agreement.

This spring, 2,571 applicants requested $26 million in cost share assistance from the program. This is nearly double the number of sign-ups and dollars requested from landowners seeking assistance in implementing best management practices to address potential environmental concerns. Best management practices approved through the program help reduce animal waste nutrients, prevent the loss of topsoil, and minimize sediment and other nonpoint source pollutants in Kentucky's streams, rivers, lakes and groundwater supplies.

Based on available dollars, the Kentucky Soil and Water Conservation Commission reviewed, ranked and approved funding for 920 applications in 108 counties totaling $11.1 million. The highest priority is given to projects that address animal waste concerns and to individual applicants enrolled in agricultural districts with identified water quality programs.

Approximately $6.2 million was approved for beef operations, $1.8 million for poultry operations and $1.6 million for dairy operations. The remaining funds went to agronomic practices to address soil erosion concerns. An additional $117,600 was approved for swine operations to improve animal waste management programs.

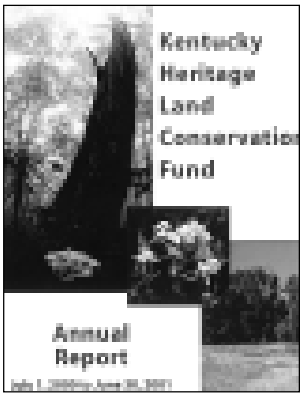
Local conservation districts will receive 54 environmental grants to help fund community projects such as metal and white goods pickup and recycling, dead animal removal, landowner watershed awareness programs, water quality monitoring and other initiatives that address community-wide environmental concerns.

For more information concerning the Soil Erosion and Water Quality Cost Share program, please contact your local conservation district.

Annual report published by board

By Mary Jean Eddins
Department for Natural Resources

Preserving nearly 16,000 acres of natural areas since 1995 is only one of many accomplishments of the Kentucky Heritage Land Conservation Fund Board (KHLCFB). The board has released its sixth annual report that details these accomplishments through the fiscal year that ended on June 30, 2001.



During the last 12 months, the board provided funding for the purchase of Croushorn Woods in Harlan County, which protects one of the largest privately owned areas within the Martin's Fork Wild River Corridor. It also assisted with the purchase of Emerson-Letourneau Woods, a high-quality, bottomland forest near the Mississippi River in Fulton County and provided partial funding for the purchase of a key parcel at Blanton Forest, the largest-known old-growth forest in Kentucky.

The board was created to award grants to state agencies, state colleges and universities, and county and local governments to purchase, protect and manage natural areas and wildlife habitat across the Commonwealth of Kentucky. Funding for these grants is provided by the state portion of the unmined minerals tax, environmental fines, sales of nature license plates and interest on the fund's assets. During the last fiscal year nearly $5 million in grants were awarded.

The KHLCFB is very pleased with the program's success and encourages drivers with Kentucky nature license plates to share in that success. The fund receives $10 for every nature license plate sold in Kentucky; last year receipts from the sale of Kentucky nature license plates exceeded $600,000.

If you would like a copy of the board's annual report or would like more information about the Kentucky Heritage Land Conservation Fund program, contact Mary Jean Eddins at (502) 564-2184. The report is also available online at **www.kyheritageland.org.**

Board announces workshop

The Kentucky Heritage Land Conservation Fund Board will host several workshops for local officials and interested landowners in the future. The first workshop will be Tuesday, Nov. 6, 2001, at Bernheim Forest.

The workshop will provide an overview of the program and will include such topics as the application process, award criteria, funding and benefits of natural areas acquisition to local communities. If you are interested in attending one of these workshops, contact Mary Jean Eddins at (502) 564-2184 or e-mail mary.eddins@mail.state.ky.us.

Martin County coal slurry release

By Mark York
Office of the Secretary

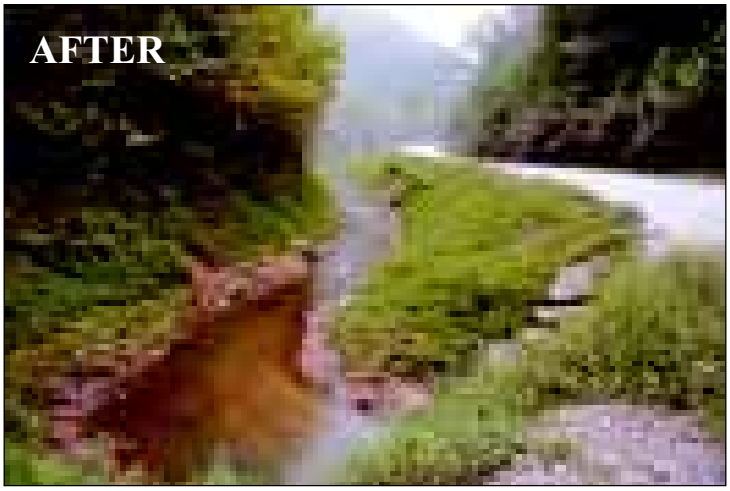
One year later—

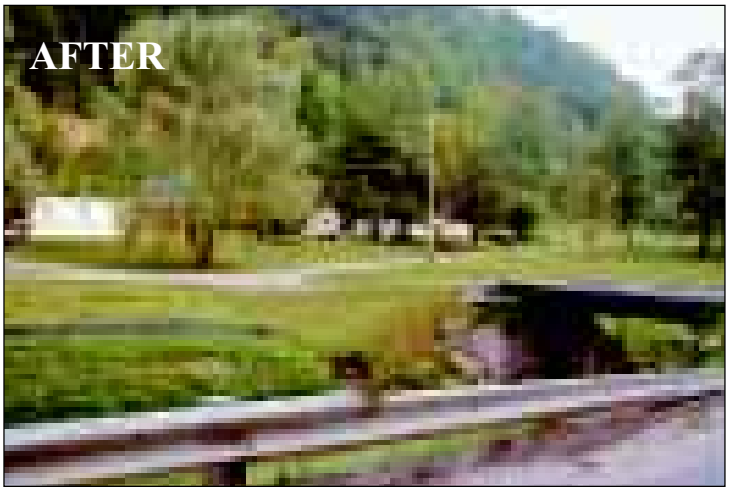
Creeks and streams in Martin County are being restored following the release of 250-million gallons of coal slurry last October from an impoundment owned by the Martin County Coal Company.

Slurry discharged from two mine portals impacted Wolf Creek and Coldwater Creek, before moving downstream into the Tug and Lower Levisa watersheds.

These photos show damage to the area following the release as well as how the areas appear today.

The Department for Surface Mining Reclamation and Enforcement and the Department for Environmental Protection issued citations against the coal company in the wake of the release. An appeal of those citations by the company is pending before the Office of Administrative Hearings.





***Before & After TOP and ABOVE:** These photographs show a portion of Wolf Creek. The coal slurry invaded this section of waterway, and heavy equipment was used to remove the slurry mixture of coal, rock dust, slate, clay and water. This portion of Wolf Creek now flows free of the slurry.*

***Before & After UPPER LEFT and LEFT:** The slurry affected many homes in the Coldwater Fork area. Here, residents experienced bridge damage as well as slurry creeping extremely close to their homes. The bridge has been repaired and the cleanup completed.*

Photographs provided by the Department for Surface Mining Reclamation and Enforcement

October 2001 — A water quality reality for Kentucky farmers

By Curtis Kirk
Division of Conservation

Five years ago, the Kentucky Division of Water approved the Kentucky Agriculture Water Quality Plan. Kentucky agriculture and silviculture producers have had since October 23, 1996, to prepare and implement an agriculture water quality plan using approved best management practices that meet the needs of their individual operations. Now, October 23, 2001, is upon us, and it is time to have these plans in place.

The Agriculture Water Quality Act (KRS 224.71-100 through 224.71-140) was passed by the 1994 Kentucky General Assembly. Its primary objective is to protect surface water and groundwater resources from pollution as a result of agriculture and silviculture activities. This legislation has elevated the Commonwealth of Kentucky as a role model in developing agriculture policy and farming practices to protect water quality.

The basic element of the Kentucky Agriculture Water Quality Plan (KAWQP) is the best management practice (BMP). A BMP is a practice or combination of practices determined to be the most effective and practicable means of reducing and preventing nonpoint source water pollution.

The Agriculture Water Quality Authority, a 15-member group appointed by the governor, is charged with the development and support of the KAWQP. Representatives from state and federal agencies, environmental organizations and leaders from Kentucky's agricultural community ensure that the plan provides standards for individual agriculture producers to develop site-specific water quality plans for their operations. These plans are the responsibility of any landowner with 10 or more contiguous acres engaged in agriculture or silviculture production. Water quality plans are not required to be filed with any state or federal agency, but must be made available to the Kentucky Division of Water in the event a water pollution problem is identified and is traceable to a specific operation.

Working together, the Kentucky Soil and Water Conservation Commission, Kentucky Division of Conservation and Kentucky's 121 local conservation districts have played a major role in the implementation of this legislation. They provide information, education and technical and financial assistance to landowners to ensure their ability to comply with the requirements of the act. As a result of the passage of this legislation, added protection is given to agriculture producers who have traditionally followed conservation plans, forest management plans and compliance plans by incorporating them into an agriculture water quality plan. Assistance is available through Kentucky's 121 conservation districts for those landowners who have not developed a plan.

To date, approximately 40,000 individual agriculture water quality plan self-certifications have been filed voluntarily in local conservation district offices. Local conservation districts, the Cooperative Extension Service and others have made a cooperative effort to educate and assist producers in the preparation and certification of their plans. Through combined efforts, 356 agriculture water quality meetings have been held, 547 media events have taken place and more than 125,000 personal contacts have been made for the purpose of educating landowners.

Agriculture water quality in Kentucky is an on-going process. The KAWQP has been revised to clarify specifications and to reflect new regulatory requirements. It is important that affected landowners and producers be kept aware of their responsibility to meet these requirements. Individuals can keep informed of the plan's latest changes and updates by contacting their local conservation district office. A new version of the plan will be printed in October and updated as needed.

Conservation Technician Kerry Winders, NRCS District Conservationist Donnie Owen and Administrative Asst. Nancy Davenport point to a display that indicates more than 90 percent of Todd County landowners have completed agriculture water quality plans. Photo by Sheila Keeling, Todd County Conservation District

Panel announces recipients of 2001 air quality stewardship awards

By Rose Marie Wilmoth
Air Quality Representative

Four Kentucky businesses were presented with Small Business Air Quality Stewardship Awards on Sept. 18 at the Lieutenant Governor's Mansion. The Air Quality Small Business Advisory Panel (Small Business Stationary Source Compliance Advisory Panel) established the award in 1997 to recognize small businesses that have gone above regulatory requirements to reduce the impact of their operations on air quality.

Natural Resources and Environmental Protection Cabinet Secretary James E. Bickford presented the awards to the following 2001 honorees:

- Vic-Tone One-Hour Dry Cleaners, Nelson County
- Fort Mitchell Garage, Kenton County
- Seibert Auto Service, Campbell County
- Mid-America Machine Inc., Graves County

Owner Jack Barnes, **Vic-Tone One-Hour Dry Cleaners**, developed a Superfund Education Program that included a video based on his experience with site clean-up while president of the Kentucky Fabricare Association. He spoke before several congressional committees about the superfund program and installed a dry-to-dry clothes cleaning system several years prior to the regulatory deadline.

Both **Seibert Auto Service and Fort Mitchell Garage** have a high success rate for repair of cars that do not pass the initial vehicle emissions test (VET). The garages are helping to inform their communities about the VET program through conscientious service, distribution of educational material to customers and participation in workshops.

Mid-America Machine Inc. is a metal finisher that must comply with a regulation on chromium plating. The federal government has not provided the extensive assistance to this type of small business that it has to many others. This small company installed a three-stage composite mesh pad scrubber system to control emissions from the plating tanks. By early installation of a superior scrubber system, Mid-America Machine Inc. demonstrates the type of small business the panel would like others to imitate.

All four of these companies foster the ethic of air quality stewardship that the panel wanted to recognize when it established the award four years ago.

The Small Business Air Quality Stewardship Award was presented to Mid-America Machine Inc. (Left to right) Cabinet Secretary James Bickford; Sandra and Paul Crowell, owners of Mid-America Machine; Bill Clark, Division for Air Quality Paducah Office; Diana Andrews, panel member and division assistant director; and Jon Trout, acting panel chair and Jefferson Co. Air Pollution Control District assistant director. Photo by Rose Marie Wilmoth

Kentucky leads the journey on the alternative fuels highway

Continued from Page 5

Fuels Coalition, praised public/private partnership efforts that made the event possible, noting that ethanol is "a renewable source of energy for our future that reduces our dependency on foreign oil."

The ethanol market is not Kentucky's only alternative fuel success story. Projects throughout the state include electric and hybrid electric vehicles (University of Louisville, Transit Authority of River City and the City of Louisville), compressed natural gas (U.S. Postal Service, Louisville; Fort Knox Military Reservation; Louisville International Airport) and LPG (Cincinnati/Northern Kentucky Airport).

Another promising alternative fuel is biodiesel—a cleaner-burning diesel replacement fuel made from natural, renewable sources such as vegetable oils. It is biodegradable and requires minimal engine modification when used either as a blending component or as is, and is cleaner burning than the diesel it replaces.

Since April 1, the Lexington Transit Authority has been using B20, a common blend of 20 percent biodiesel made from soybean oil and 80 percent petroleum diesel, in its fleet of 46 city buses. The initial biodiesel program ran through June 30 and was funded by the Kentucky Soybean Board. In addition to the clean air benefits, biodiesel can be used in existing vehicles and no engine modifications have to be made. A further economic benefit is that the biodiesel for the project is produced by Griffin Industries based in Cold Spring, Ky., in Campbell County. Other biodiesel projects in the state include Sweetbriar Farm in Danville and the Transit Authority of Northern Kentucky. These projects help fulfill the goal of the nationwide Clean Cities Program—promote the use of alternative fuels/alternative fuel vehicles in high visibility, high-fuel use fleets such as airports, transit authorities, delivery fleets and state/local governments.

For more information, visit the Kentucky Clean Fuels Coalition at **http://www.kentuckycleanfuels.org/**

Commission celebrates a quarter-century

Continued from Page 10

special concern. Unfortunately, several unique members of presettlement Kentucky have disappeared including the Ivory-billed woodpecker, Passenger pigeon, Carolina parakeet, Greater prairie-chicken, American bison, Gray wolf and Eastern puma.

Ecology

The primary focus of the ecology program is to conduct natural areas inventories of the 120 counties in Kentucky. The program locates the best-remaining natural areas in the Commonwealth for protection in the state nature preserve system. Sites deemed significant are then added to the commission's Natural Heritage Database that generates a "shopping list" of sites in need of protection.

Another up-and-coming project is the Large Forest Block project. Kentucky is approximately 50 percent forested, but it is unknown how that forestland is distributed. This project, designed to locate the largest remaining tracts of contiguous forest, uses geographic information systems (GIS) technologies including satellite, aerial photos and sophisticated computer software. Once these tracts are located, ecologists will determine their quality and seek ways to protect those most significant.

Data Management

All of the information about rare species, communities and natural areas that KSNPC biologists and other contributors generate is maintained in a specialized Biological and Conservation Database. The computerized data, containing 10,336 records tracking 753 rare plants, animals, lichens and natural communities, is cross-referenced with manual files, topographic maps and, increasingly, GIS coverage.

The data management team strives to maintain the highest quality of information in the database, thereby ensuring that the reports provided from this database, and utilized by researchers, consultants, agencies and individuals, is extremely accurate.

Biologists review the listed species for changes in state rank and protection status on an annual basis and publish their changes in the Journal of the Kentucky Academy of Science. The status and ranking information generated by KSNPC biologists is considered the best available for Kentucky and is used to determine regional and global status and distribution of species.

Natural Areas Registry

The Kentucky Natural Areas Registry is a nonbinding, nonregulatory program that encourages the stewardship of natural lands in private ownership. It awards plaques recognizing owners for their commitment to preserve some of Kentucky's most unique remaining habitats.

To date, a total of 48 landowners have agreed to register their natural areas, encompassing more than 4,000 acres in 32 counties. Participation by private landowners is key to protecting Kentucky's biodiversity.

Preserve Stewardship

The Nature Preserves and Natural Areas Branch is responsible for the management of the preserve system. Its work includes habitat restoration, rare species management, site interpretation for the public and coordination of research, particularly by faculty and graduate students. Kentucky's 41 state nature preserves are safe havens for the state's most imperiled plants, animals and natural communities. The preserves also provide opportunities for research, education and passive recreation.

Many of the state nature preserves are open all year for public visitation. Explore the wonders of nature by hiking a forest in springtime filled with the colors and scents of wildflowers and the songs of migrating warblers. Study the complex interconnections between a red-spotted newt and its habitat. Watch the seasonal parade of color as a prairie returns from the ashes following a prescribed fire. Volunteer to build a trail or help remove invasive plants.

For more information about KSNPC's wide array of activities and programs or to volunteer, call (502) 573-2886 or visit the commission's Web site at **www: kynaturepreserves.org.**

Kentucky State Nature Preserves (SNP) and the counties where they are located:

Axe Lake Swamp SNP, Ballard
Bad Branch SNP, Letcher
Bat Cave SPNP, Carter
Beargrass Creek SNP, Jefferson
Blackacre SNP, Jefferson
Blanton Forest SNP, Harlan
Blue Licks SPNP, Robertson
Boone Co. Cliffs SNP, Boone
Brigadoon SNP, Barren
Cascade Caverns SPNP, Carter
Chaney Lake SNP, Warren
Crooked Creek Barrens SNP, Lewis
Cumberland Falls SPNP, McCreary
Cypress Creek SNP, Muhlenberg
Dinsmore Woods SNP, Boone
Eastview Barrens SNP, Hardin
Flat Rock Glade SNP, Simpson
Floracliff SNP, Fayette
Goodrum Cave SNP, Allen
Hi Lewis Pine Barrens SNP, Harlan
Jesse Stuart SNP, Greenup
Jim Scudder SNP, Hardin
John B. Stephenson Memorial Forest SNP, Rockcastle
John James Audubon SPNP, Henderson
Kingdom Come SPNP, Letcher
Logan Co. Glade SNP, Logan
Lower Howard's Creek Heritage Park and SNP, Clark
Metropolis Lake SNP, McCracken
Natural Bridge SPNP, Powell
Obion Creek SNA, Hickman
Pilot Knob SNP, Powell
Pine Mountain SPNP, Bell
Quiet Trails SNP, Harrison
Raymond Athy Barrens SNP, Logan
Six Mile Island SNP, Jefferson
Terrapin Creek SNP, Graves
Thompson Creek Glades SNP, Larue
Three Ponds SNP, Hickman
Tom Dorman SNP, Garrard, Jessamine
Vernon-Douglas SNP, Hardin
Woodburn Glade SNP, Warren

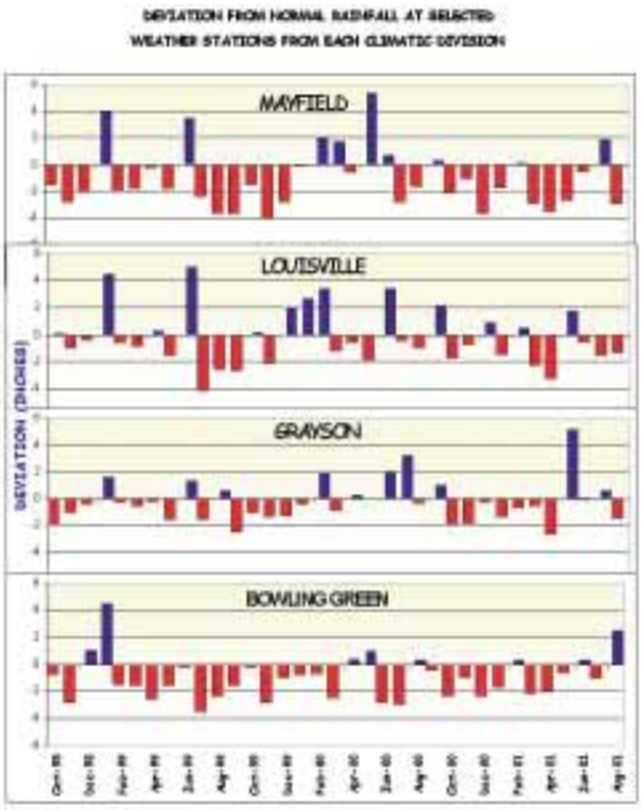
Kentucky's drought conditions Better or Worse

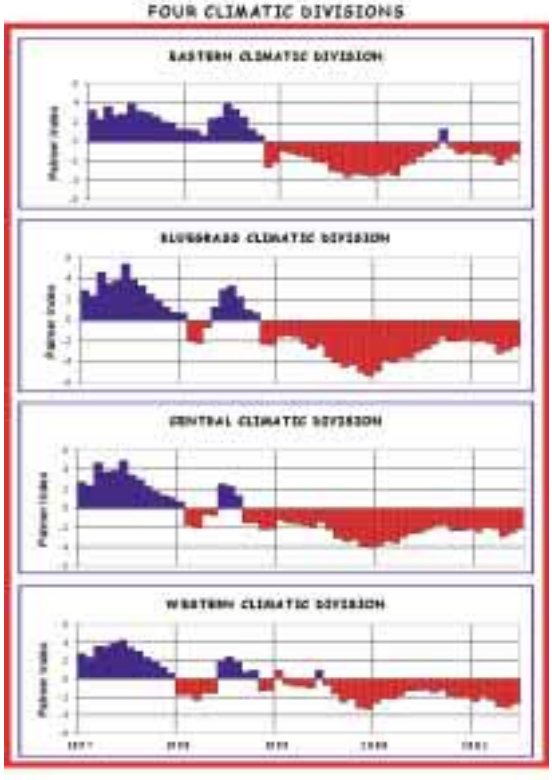
Article and graphics by Bill Caldwell
Division of Water

After a relatively wet summer that brought flooding to some areas, it may be hard to believe that only a few months ago we were gripped in the clutches of drought. Remembering the heavy rains and flooding earlier this year might beg the question "are we out of the drought yet?" Since it is impossible to predict when a dry spell will begin or end, it might be more appropriate to ask whether conditions are getting better or worse with respect to drought.

Droughts that are severe enough to significantly impact streamflows, groundwater levels and lake levels are fairly slow to develop and may not be recognized until drought conditions are firmly established. The current drought referred to by most as the "drought of 1999" actually had its genesis in the summer of 1997, the same year that record floods devastated some parts of northern Kentucky. Palmer Index values for the four climatic divisions of Kentucky began a steady decline in July 1997, reaching moderate drought conditions by March 1998 in all but the eastern quarter of the state. After a brief respite in the summer of 1998, mild to moderate drought conditions developed through the winter, and by May 1999 the eastern three-fourths of the state had reached moderate drought status. As a result, water sources such as rivers, wells and lakes were already under stress at the beginning of one of the driest summers on record. After record low rainfall in July, August and September, the drought of 1999 reached "severe" and "extreme" levels on the Palmer Index, taking its place among the worst on record, most notably 1930, 1941 and 1953.

The drought of 1999 did not end with the millennium, however, continuing through the year 2000 and into 2001. By April of this year, we were once again on track for a repeat of 1999 or worse. As of this writing in September, drought conditions have eased substantially with normal to above-normal amounts of rainfall in the past few months. A brief look at some important indicators of drought and its impacts indicates that conditions are improving.





Rainfall (Top Right)

Measurements at several weather reporting stations indicate normal to above normal amounts of

rainfall for much of the state since May 1. However, rainfall patterns represent no more than a short-term break in an otherwise long-term pattern of below-normal rainfall, especially in the central and western climatic divisions. Drier-than-normal conditions prevailed in August, returning to a pattern that is all too familiar in some areas.

In Mayfield, monthly rainfall deficits of at least one inch have been recorded in 22 of the last 35 months since Oct. 1998.

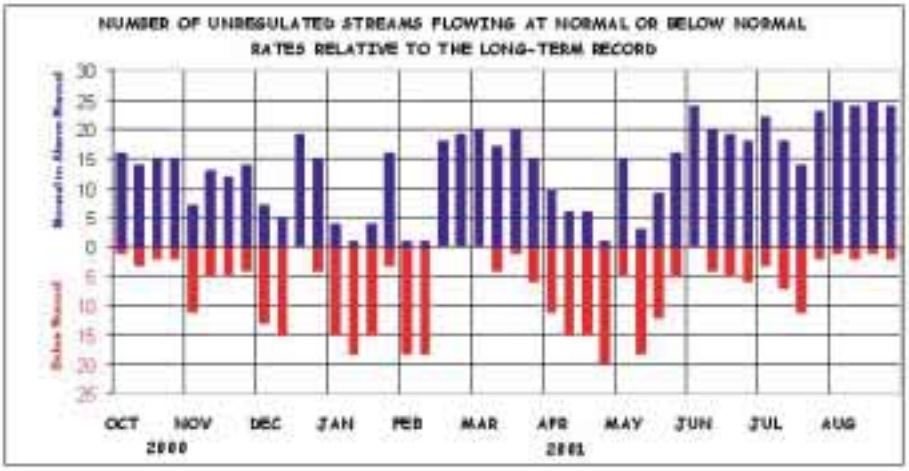
The Standardized Precipitation Index from the National Drought Mitigation Center places all of Kentucky in "near normal" status for the six-month period ending July 31, 2001, due in large part to above-normal rainfall in June and July.

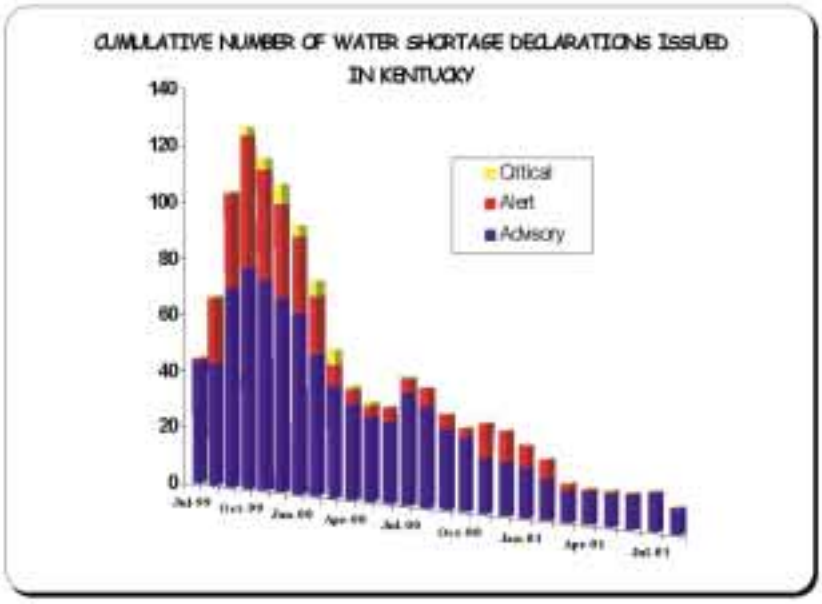
Palmer Index (Lower Left)

The Palmer Index is useful for monitoring prolonged departures from normal hydrologic conditions. The index uses data for rainfall, temperature and soil moisture to "rate" current hydrologic conditions. Blue bars indicate increasingly wetter conditions while the red bars describe increasingly drier conditions. While we have not seen a repeat of the extreme conditions of 1999, the index indicates that for most of 2000 and 2001 a majority of Kentucky has remained close to "severe" drought status. In spite of favorable summer rains leading to improvements in a large part of the state, moderate drought is still indicated for the central and western divisions where year-to-date rainfall deficits are still eight to 10 inches below normal in places.

Streamflow (Top Right)

Of the 20-25 unregulated streams that are closely monitored by the Division of Water, at least 80 percent have been at or above normal flow in 10 of the last 13 weeks ending Aug. 31, 2001. In contrast, a majority of streams from December through February were below normal in seven out of 12 weeks. Flows in the spring were dismal as well, with lower-than-normal streamflows for most streams in six out of eight weeks in April and May.





Water Supplies (Upper Right)

The number of water supply systems in Kentucky issuing water shortage declarations climbed from 42 in July 1999 to more than 125 by Oct. 1999. These numbers were reduced to below 30 by May 2000. Dry conditions in the summer of 2000 prompted about 10 additional water suppliers to ask for voluntary conservation, but by March 2001 only 10 systems remained on any kind of water shortage declaration and those were only precautionary and not directly related to an actual water shortage.

Currently, seven systems remain on an advisory, but only one of these is related directly to conditions that have developed in 2001.

Taken together, these indicators suggest a moderate level of improvement over the past few months that has helped to maintain adequate water supplies in all climatic divisions. Even so, the improving conditions are only a recent development and should not be taken as evidence that we are no longer susceptible to the impacts of drought. The "drought of 1999" is, in reality, a multi-year dry spell that is still with us. It will likely end as gradually as it began.

Awards

Davis chosen as outstanding forest steward

By Gwen Holt
Division of Forestry

What is a forest steward?

A forest steward is a landowner who has completed and is actively implementing a forest stewardship plan for his property.

Herb C. Davis II of Liberty, Ky., was chosen to receive the first Outstanding Forest Steward Award for his dedication to completing and implementing a forest stewardship plan for his 140-acre woodland property. Davis began implementing stewardship activities in 1983 and was certified as a forest steward in 1995.

Herb Davis (left) with forester Tim Arnzen. Arnzen nominated Davis for the award. Division of Forestry photo

Davis was presented the stewardship award in July at the annual meeting of the Kentucky Association of Conservation Districts. The award is sponsored by the Kentucky Division of Forestry, and all landowners with 10 or more acres of woodlands are eligible to participate in the program. For more information, contact the Division of Forestry at (502) 564-4496.

What is a forest stewardship plan?

A landowner with 10 or more acres can request assistance from a forester to develop a plan to actively manage his property to reach his land-use goals. Based on the landowner's land-use objectives, a forester and a wildlife biologist, if needed, will evaluate the property and make recommendations for reaching the desired goals.

Some landowners are interested in improving wildlife habitat, others want to manage their woodlands for economics (timber), and some are interested in watershed management, forest recreation and aesthetics.

Davis has implemented numerous forest management activities during the last 20 years. He conducted a salvage timber harvest for lumber to build a home, for firewood to sell and also for personal use. In addition, Davis planted 18,250 trees on 27 acres, installed 6,500 feet of fire lanes, planted seven acres of wildlife cover and food, and installed fencing to keep livestock from grazing in the woodlands. Davis's woodlands have been used for educational opportunities, allowing students and other landowners to learn about conservation and forestry.

Awards presented at conference

By Martin Bess
Division of Conservation

More than 500 people attended the 58th Annual Kentucky Association of Conservation Districts State Convention in July in Louisville. The following individuals were recognized for their environmental efforts:

Distinguished Service Award: Natural Resources and Environmental Protection Cabinet Secretary James E. Bickford.

Conservation Person of the Year: U.S. Congressman Hal Rogers.

Outstanding Conservation Cooperator Award: Harold and Sandy Whitaker, Rockcastle County (awarded $500). State runners-up are Danny and Judy Cunningham, Calloway County (awarded $250).

KACD President Patrick M. Henderson (right) presents James Bickford with the Distinguished Service Award. Division of Conservation photo

Conservation awards (continued)

Outstanding Conservation District Environmental Education Award: Bath County Conservation District.

Secondary Conservation Teacher of the Year: William G. Turpin, Madison County, a vocational agriculture teacher at Madison Central High School in Richmond.

Elementary Conservation Teacher of the Year: Cynthia Rowland, Barren County, a fifth- and sixth-grade teacher at Hiseville Elementary.

Goodyear Conservation Awards Program: Woodford County Conservation District (eastern Kentucky) and Todd County Conservation District (western Kentucky).

Goodyear Honor Award: Boyle, Fayette, Fleming, Hart, Hopkins, Mercer and Scott county conservation districts.

Goodyear Area Winners: Area 1—Crittenden County; Area 2—Ohio County; Area 3—Edmonson County; Area 4—Nelson County; Area 5—Pendleton County; Area 6—Clark County; Area 7—Jackson County; Area 8—Montgomery County; and Area 9—Harlan County.

Forestry Awards: Hart County Conservation District and the Kentucky Division of Forestry Central District Office.

Soil Stewardship Award: Floyd County Conservation District.

Conservation District Junior Board Award: Taylor County Conservation District Junior Board.

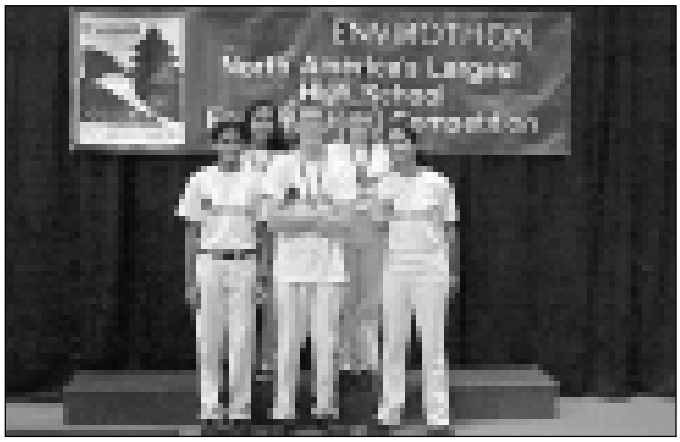
KACD Auxiliary Scholarship: Morgan A Wills, Clark County.

George Crafton Memorial Scholarship: Michael H. Dennis, Webster County.

Kentucky Envirothon: Southwestern High School, Pulaski County.

Kentucky Buffer Achievement Award: (west region) Webster County—1st; Christian County—2nd; and Shelby County—3rd. (east region) Fayette County —1st, and Clark County—2nd.

Ky. high school brings home eighth place



Southwestern High School team members from left to right: Amisha Patel, Meera Patel, Ben Gonzales, Rachael Smith and Rina Patel. Division of Conservation photo

By Martin Bess
Division of Conservation

Among the mass of students representing 42 states and seven Canadian provinces, one group of Kentucky students stood out from the crowd. Pulaski County's Southwestern High School brought home the eighth place finish while competing in the international finals of the 14th annual Canon Envirothon in Raymond, Mississippi, in July.

The Canon Envirothon is the largest environmental high-school science competition in North America and one of several initiatives sponsored by Canon U.S.A. to promote environmental awareness, conservation and education. Its mission is to develop knowledgeable, skilled and dedicated citizens willing to work toward achieving and maintaining a natural balance between the quality of life and the quality of the environment. The national competition started in 1979 in Pennsylvania and annually involves about 500,000 students from the U.S. and Canada. The students first compete locally, then the winners compete at the state level to determine which team will represent its state at the national Envirothon.

Southwestern High School's five-member team tested their knowledge of natural resources including such topics as soils, forestry, wildlife, water and current environmental issues; the 2001 issue was urban nonpoint source pollution. Southwestern's best finish of the six categories was second place in the oral competition. Forty-nine teams, more than 250 students in all, took part in the event. Contestants vied for a share of the $30,000 college scholarship as well as the mantle of Canon Envirothon champion. Each Southwestern team member received a Canon SureShot 85 Zoom camera.

Pennsylvania took first place in the 2001 Canon Envirothon with Mississippi coming in second, North Carolina third, New Jersey fourth and New Hampshire fifth. Minnesota, Maryland, Kentucky, Connecticut and California placed sixth through tenth.

The Kentucky Association of Conservation Districts, local conservation districts and many agencies and organizations sponsor the Envirothon in Kentucky. Southwestern High School qualified to represent Kentucky by winning the Envirothon state competition during May in Hardinsburg, Kentucky. This is the third year that Kentucky has sent a representative to the Canon Envirothon; Caldwell County High School represented Kentucky the first two years.

For more information about the Envirothon, contact your local conservation district or the Division of Conservation at (502) 564-3080 or e-mail martin.bess@mail.state. ky.us.

Students learn about Kentucky minerals

By Ralph King
Department for Surface Mining Reclamation and Enforcement

Jean Abney (left) used sign language to translate to the children as Donna Schartung described Kentucky's minerals and their many uses. Department for Surface Mining Reclamation and Enforcement photo

Department employees Donna Schartung and Tom Jones provided a classroom learning activity for a group of nine- and ten-year-old students at the Kentucky School for the Deaf. Summer school teacher Jean Abney requested the department's help in teaching the deaf and hard-of-hearing students how geology and coal affected the lives of American Indians and early settlers. "The school's library contains books and videos, but a live classroom demonstration truly captivates the students, especially when they can see and touch," said Abney.

Schartung brought rock and mineral samples found across the state including iron ore, freshly mined coal and some weathered coal similar to what American Indians and settlers would have found in creeks and river banks in the coal-bearing regions of Kentucky. Settlers finding iron ore would burn coal to melt and work iron into tools. Several iron foundries are still standing in Kentucky, the most famous is near Irvine in Estill County.

Jones, an expert in American Indian culture and co-chair of the Kentucky Native American Heritage Commission, explained that when campfires were built inside a ring of stones, some of the black rocks glowed red and stayed very hot, thus making American Indians the first users of coal. In addition to coal, they collected flint to use as arrowheads and knives to help in their daily tasks of survival.

"The kind of demonstrations provided by the department's employees is a very valuable resource to Kentucky classrooms. Through the knowledge and enthusiasm exhibited by these professionals, students are able to strengthen their science skills," said Nancy Mann, supervisor of the Kentucky School for the Deaf summer school programs.

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